

Investigation of Position of Lateral Femoral Cutaneous Nerve in Teepee View (Visualization of Nerve Position Using Cadaveric Model and Fluoroscopy)

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Purpose: During external fixation or mini-invasive approaches for pelvic fractures, the gold standard is to delineate and utilize radiographic Teepee View (TPV), to safely insert long pin-screws through the anterior inferior iliac spine into the bone. In doing so, it has been reported to stimulate the lateral femoral cutaneous nerve (LFCN). This study aims to validate and advocate, within a safe area, the use of anatomical literature to visualize the location of the TPV where the LFCN is running using fluoroscopy.

Methods: 17 cadavers, 7 males and 10 females, fixed in 10% formalin solution were dissected. Cadavers had an average age of 88.9 ± 7 years, an average height of 156 ± 9.6 cm, and an average body mass index (BMI) of 16.8 ± 3.1 . The left LFCN was identified from the lumbar plexus (L2-L3) and the running was visualized by fluoroscopy with a soft wire along the LFCN. TPV visualized the teardrop connecting the anterior inferior iliac spine and posterior inferior iliac spine. Anatomically, the LFCN transit position and branching patterns were at the level of the inguinal ligament. In the fluoroscopic image, the percentage of LFCN was visualized within the TPV, and the iliac inner plate-outer plate maximal transverse diameter within the TPV was created (Teepee circle) and 4 were segmented by a line representing the maximal transverse diameter and a line passing through the center of the maximal transverse diameter, from the apex of the TPV (medial proximal is A, medial distal is B, lateral proximal is C, lateral distal is D). The extent of LFCN passage through the same area was assessed as 1 point.

Results: In the anatomical evaluation, all patterns medially passed through the anterior superior iliac spine, with a branching pattern of 76.4% showing no bifurcation, 17.6% of bifurcation within the pelvis, and 3 bifurcations at 5%. The percentage of LFCN runs in TPVs was 94% (16/17 bodies), and the percentage of passes through the Teepee circle was 22 points; the percentage by ranges was A: 32% (7/22), B: 4.5% (1/22), C: 41% (9/22), and D: 23% (5/22).

Conclusion: The proportion of LFCN running in TPV is as high as 94%, and it is necessary to exercise caution when approaching surgery. Among the Teepee circle, 96% run on the lateral and medial proximal sides; therefore, if a pin or large screw head is fitted for a long time, inserting it in a safe distal medial, in the lateral proximal direction, and not protruding the screw head or burr is considered to be a method to reduce irritation symptoms.